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ABSTRACT

From its origins in manual training programs in the Nineteenth Century, industrial arts today, in South Carolina, is viewed as a necessary part of education for all students, with specific objectives in harmony with those of education in general. Industrial arts draws its content and methodology from industrial technology and the social implications of the utilization of industrial knowledge, products, and services. It has many factors in common with other subject fields. At the elementary school level, its purpose is to provide opportunities to study how man satisfies his desire for material good. At the middle school level, the purpose is the study of industry through exploratory experiences. At the senior high school level, the student sees and experiences the broad realm of industrial processes in modern industry. Special programs for adults, handicapped, and gifted students are organized. Laboratory facilities must be planned with the relevant factors considered. Industrial Arts teacher preparation must include general and professional education and industrial arts courses. The management of industrial arts programs includes the State and local supervisors, the school principal, and the teacher. Safety practices must be observed by the instructor and students. (A five-page list of references divided by subject is provided.) (AG)

ED 089023

Guide for

INDUSTRIAL ARTS

in SOUTH CAROLINA SCHOOLS

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DEPARTMENT of EDUCATION
SOUTH CAROLINA

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GUIDE FOR
INDUSTRIAL ARTS
in
SOUTH CAROLINA SCHOOLS

Prepared in Cooperation with the
South Carolina Industrial Arts Executive Committee

Prepared by:

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FOREWORD

Ours is a dynamic, ever-changing society. Preparing students to meet challenges of this ever-changing society places multitudinous demands upon education. The numerous changes resulting from our accelerating technology levy great demands upon industrial arts education. It is simply not enough to educate students to live in a world that is changing at such a rapid pace; it is also necessary to transmit to the student a sense of values and the worth of participation in the technological process which is such a vital part of our society. Industrial arts, as an integral part of education, must provide opportunities for individual fulfillment, individual achievement and individual freedom.

The success of the industrial arts program in providing these opportunities depends upon several factors, of which the philosophy, the content and the approach to teaching are vital aspects. This guide has been prepared to assist the administration and the teacher in carrying out their duties in meeting the challenges, demands and responsibilities placed upon them.

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Introduction

1.0 INTRODUCTION

1.1 Background of Industrial Arts Education

During the latter part of the Eighteenth Century, the results of the Industrial Revolution in England began to cause some changes in every area of man's endeavor. During the early part of the Nineteenth Century, these changes began to reach the United States and with these rapid and radical industrial changes came the need for changes in education. Prior to the latter part of the Nineteenth Century, the school curriculum in the United States was devoted primarily to the "three Rs" and basic spelling. During the last two decades of the Nineteenth Century, manual training was introduced into the curriculum designed to provide the student with general knowledge, skills and attitudes considered essential in preparing him to live in an industrial society. The first manual training school was established in St. Louis, Missouri, during this period.

It was not the purpose of the program to train the student in any particular trade, but to have him acquire skill in the use of tools and materials which could be applied in most of the trades. Through a series of grade exercises in the use of tools and materials, these skills were to be developed. Students were allowed to work on projects after school hours, but were required to follow the established course of exercises during the regular shop period.

From the early manual training programs of the Nineteenth Century, the present day industrial arts education programs have developed. Changes in philosophy, aims, purposes, teaching methods, evaluation techniques, and facilities have taken place along side of other changes in our industrial society. The remaining part of this section, and the sections to follow, reflect those changes and present the philosophy and objectives of industrial arts education in South Carolina.

1.2 Philosophy

Industrial arts is the program in education which provides manipulative and informational experiences in the tools, machines, processes, materials, products, occupations, and organizations of the technological world in which we live. The following statements reveal the philosophy within which industrial arts exists:

1. The study of industrial arts is a necessary part of all education for boys and girls from kindergarten through adulthood.

2. Industrial arts education has three main goals:
   a. to acquaint the young with the nature of the culture,
   b. to improve society and the environment of man,
   c. to aid in the maximization of individual potential.

3. The objectives of industrial arts education are in harmony with those of education in general – the industrial nature of the experiences within industrial arts is the unique contribution to meeting these objectives.

4. Industrial arts draws its content and methodology from industrial technology and the social implications of the utilization of industrial knowledge, products and services.

5. Industrial arts provides for self-realization and self-expression through creative and individualistic experiences in a world where change tends to de-emphasize individuality.

6. Industrial arts provides orientation to our technological heritage and environment.

1.3 Objectives

Thus, industrial arts emerges as that program within the education curriculum which seeks to acquaint the young with the nature, potential and problems of a technological society. The study of industrial arts should be directed to the following educational objectives so that the student will be able to:

1. Apply the democratic process in solving problems common to our technological culture.

2. Make intelligent consumer choices based on his experiences with materials, processes and products of industrial organizations.

3. Evaluate career opportunities and requirements in terms of his self-appraisal of abilities, interest and aspirations.

4. Recognize the nature and effects of the application of technology through industry and their implications on society and environment.

5. Express ideas through designing, planning and constructing projects which reveal creativity, self-expression and personal achievement.

1.4 Relationship of Industrial Arts Education to Other School Curriculum Subject Fields

Industrial Arts Education has many factors in common with other subject fields, such as content, principles, academic skills, knowledges, and attitudes. The following examples list some typical relationships:

Relationship of Industrial Arts to Fine Arts: Students apply knowledge of materials and tool processes to design. The adapting and combining of design elements in projects is encouraged. Ability to recognize and appreciate good design and construction is developed. Opportunities are provided for creative activity. Acquired technical skills are applied to design and construction problems in the fine and dramatic arts.

Relationship of Industrial Arts to Health and Recreation: Students develop safety attitudes for home, community and industry. Personal hygiene is practiced. Students learn to build recreational equipment. The therapeutic values of working with tools and materials as hobby and recreational activities are emphasized.

Relationship of Industrial Arts to Language Arts: Students utilize oral and written communication in school laboratory activities. Vocabulary is increased and enriched through the

understanding and use of industrial terms. Special language skills are developed by written technical reports, specifications, material orders, and by using handbooks, catalogs, books, and reference materials.

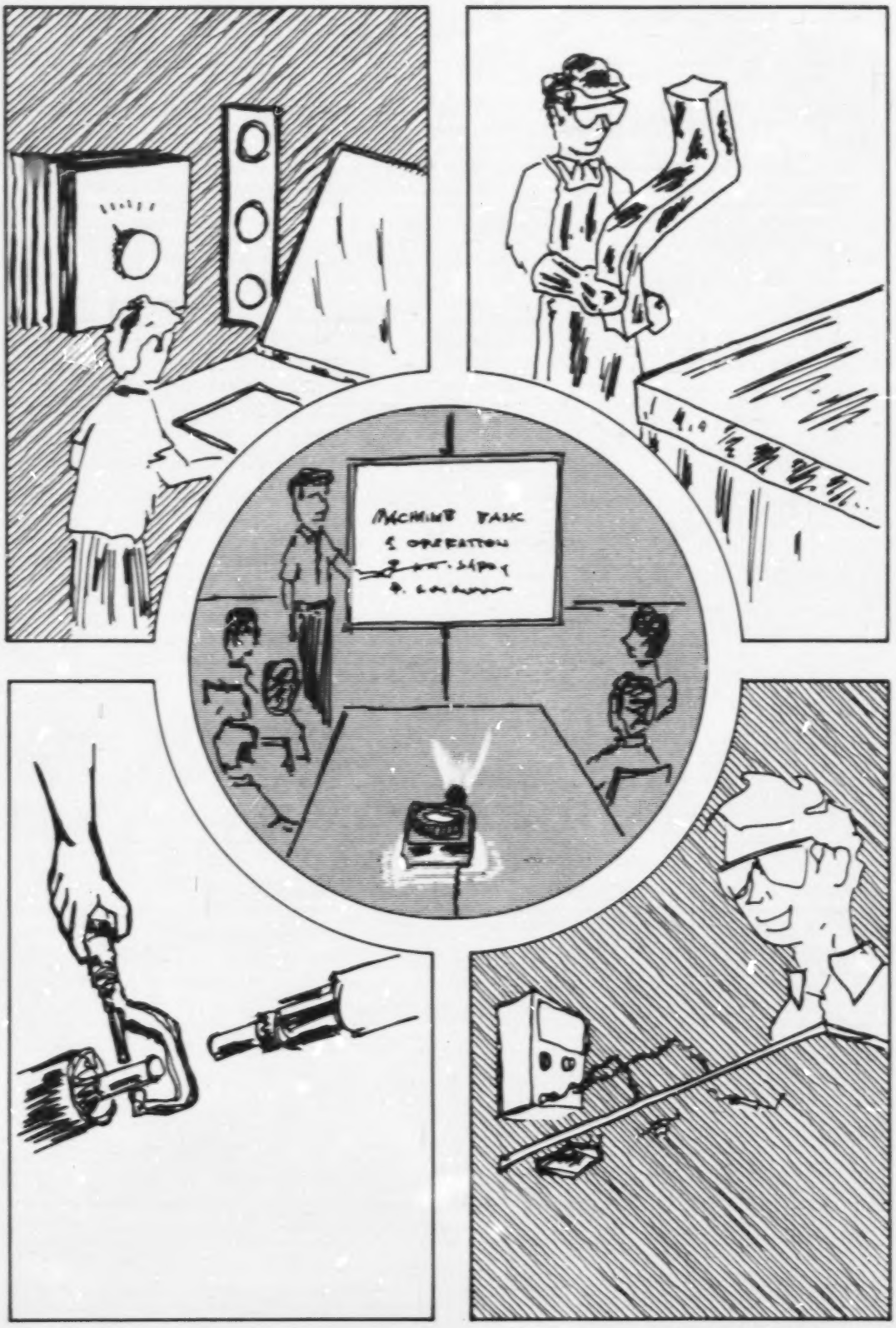
Relationship of Industrial Arts to Mathematics: Students make extensive use of measuring processes. Accuracy and computational skills are developed. A wide range of experiences is provided in the use of symbols and formulas. Computations are an integral part of many processes and jobs. Concepts of tolerance are developed. Skills are acquired in the estimating and judging of size, quantity, and fit.

Relationship of Industrial Arts to Science: Students are given opportunities for research, investigation and experimentation. The scientific method is used in solving problems in the school laboratory. Mechanical skills are developed which are necessary in the construction of equipment for scientific experimentation.

Relationship of Industrial Arts to Social Studies: Students practice democracy in establishing procedures for laboratory management. Effective human relations are developed by student participation in laboratory management, by working together and by sharing tools and facilities. Emphasis is placed on conservation when studying human and physical resources. Industrial materials and production methods are studied. A knowledge of history, geography and economics is gained through the study of industry.

Relationship of Industrial Arts to Vocational Education: Students obtain information concerning requirements of occupations and discover vocational interests and aptitudes. Technical knowledge is applied to the solution of typical industrial problems. Tool and machine skills and accuracy are developed. Mass production, planning and manufacturing techniques are used. Advanced students have an opportunity for some concentration in an industrial occupation.

Instructional Levels



2.0 INSTRUCTIONAL LEVELS

2.1 The Elementary School

Industrial arts activities can greatly enhance the learning of the elementary child. The resourceful elementary classroom teacher, with the desire to make classroom learning relevant and with minimal assistance in the form of tools, supplies and instruction, will be able to use industrial arts to achieve this relevancy.

Most elementary classroom teachers touch upon the content of industrial arts at various times while teaching the other elementary school subjects, i.e. reading, mathematics, science and social studies. These subjects include information about people doing things, activity which causes "things" to be made, moved or changed to some degree to satisfy man's needs.

The purpose of industrial arts in the elementary school is to provide opportunity to study how man satisfies his desire for material goods. The study permits the student to learn, through the application of knowledge gained in other subjects, the skill of using what he or she has learned. At the same time, the pupil is gaining new insights and concepts about the use of his knowledge and the need for acquiring certain skills.

In the early elementary (K-3), studies are usually based on broad units about the home and community, and focusing on food, shelter, clothing, communication and transportation as major points of study. At the intermediate level (4-6) studies are based on "life" in nature or the world using topics similar to those studies in K-3.

Industrial arts activities may be carried on in the regular elementary classroom by the classroom teacher. Provisions for equipment and tools to be used by the class are minimal. Work space may be desk tops and simple hand tools (hammers, screwdrivers, saws, etc.). The demand for these provisions will vary as the class moves from one study topic to another. It may be advisable to have equipment and tools which are transferable from room to room as needed.

The school administration should provide industrial arts training for the elementary classroom teacher through in-service education workshops, part-time consultants and/or a resident supervisor. Through the teacher, industrial arts should become an integral part of the day-to-day classroom activities.

2.2 The Middle and Junior High Industrial Arts

The junior high and middle school industrial arts program offers adolescent youth a variety of laboratory experiences organized to teach broad industrial understandings. Through experiences structured to include many of the management, production and personnel practices of industry, the students study the processes, tools, materials and products of industrial technology. The industrial arts experiences may be grouped by major industries (metal working, graphic arts, etc.), industrial materials (woods, plastics, metals, etc.), or specific industrial processes (welding, drawing, machine shop); however, the focus of the industrial arts courses is on the function of industry.

The study of industry through exploratory experiences is the primary purpose of the junior high and middle school industrial arts courses. The industrial arts program includes

opportunity for the student to experience planning, completing, and evaluating industrial related activities. Through these exploratory experiences, the students develop insights and understandings of their potentialities or limitations in today's highly industrialized adult world.

The middle or junior high school industrial arts program is an on-going program in many South Carolina junior high and middle schools. In many of these schools the industrial arts programs are fulfilling their basic goal of providing exploratory experiences based on an organized study of industry. The challenge is to revise and expand their course content to better fulfill the responsibility with which they are charged.

Industrial arts programs should include attempts to innovate in their course offerings. Exploratory programs designed around broad industrial content and required of both male and female students are currently in operation. Other schools have moved to include instructional programs based on broad-structured industrial arts programs such as The World of Construction.

The major concern in organizing instructional content for the middle and junior high school industrial arts program is to provide a broad study of the industrial application of knowledge of practice, rather than concentrating only on the manipulative practices of narrowly defined industrial groups or crafts.

The industrial arts instructional program should be organized to provide exploratory study of how: (1) industries are formed and managed to satisfy man's needs, (2) industries change a variety of materials in form and structure thus adding value through processes, and (3) industries deal with people in terms of consumers, workers and investors. The instructional content may be identified in terms of traditional titles (drawing, woodworking, metalworking, electricity, graphic arts, plastics, and ceramics), but the program should include a minimum of four (4) areas of instruction, and the content of these areas selected to present not only the production practices associated with making things, but also the management task and personnel inducement needed for the production of goods. The manipulative activity for the industrial arts program will not be predicated on the development of skill in tool use. The laboratory experiences are provided to enhance the opportunity for learning of the material by means of active student participation through the practical application of knowledge.

The following list is presented as possible activities to be considered for the development of industrial arts course content built around the traditional areas of instruction:

Drawing	pictorial sketching, making data tables–charts–graphs; graphic paper layout of equipment, rooms and buildings; and the preparation of graphic materials for reproduction.
Woodworking	experimenting with a variety of woodworking handtools and portable or stationary power equipment; comparing the shaping, forming, combining, and assembling processes associated with wood products.
Metalworking	experimenting with a variety of metalworking handtools, and the portable and stationary power equipment operations, studying through performance the shaping, forming, combining, and assembling processes associated with metal products.

Electricity	exploratory activity in designing, assembling and altering electrical components or systems, experiencing the application of scientific knowledge relative to electrical product or system development.
Graphic Arts	introductory activity in developing and producing image transfer devices such as block–screen–offset printing, photography, and the processes relative to collecting, assembling and distributing, and utilization of graphic components or products.
Plastics	experimenting with a variety of plastic materials, and hand and power tools used to change the materials into finished parts or products by means of casting, injecting, laminating, heating, bending, extruding, and coating.
Ceramics	exploring the industrial process related to designing, forming and finishing ceramic products; making design models of proposed items; exploring forming practices related to current industrial usage (space medicine, construction, electronic, and other manufacturing industries).

In summary, the industrial arts program for the middle or junior high school must be organized to include experiences involving a broad base of industrial activities utilizing a variety of processes, tools, materials, and personal relationships. The learning situation should be based in a laboratory capable of dealing with a variety of individual and group learning experiences, and allowing experiences which involve a variety of processes, materials, tools and equipment.

2.3 The Senior High School

The industrial arts curriculum in the senior high school contributes greatly to the overall educational program as it relates to the functions, technology and occupational opportunities of our modern industrial society. It provides freedom for the students to study and explore the aspects of industry as they relate to the industrial and consumer use of products, thereby, enabling the student to see and experience the broad realm of industrial processes in modern industry.

The high school industrial arts curriculum should provide adequate basic instruction to meet the needs of all students: (a) college bound students, (b) students exploring more deeply the vocational, cultural, and consumer aspects of American industry, (c) students planning to pursue advanced study and careers in the areas based on and relating to the applied or technical sciences, and (d) students who will be entering the labor force prior to or immediately following graduation. To satisfy this demand, the industrial arts program should provide practical situations dealing with the industrial world of work, and provide for the development of an understanding of the industrial dimension of our society.

The senior high school industrial arts instructional program should be organized within a "General Laboratory" (a variety of instructional areas provided), or the "Unit Laboratory"

(structured to study one industrial material or industrial process). Either organization should include instruction directed to the study of current industrial utilization of the processes studied. A minimum of four subject areas should be included for study if the industrial arts program is to provide for in-depth study for a variety of student interests. The following subject areas are given for your consideration:

Drawings	Importance of drawings in industry, types of drawing in industry (production drawings, sketches, charts, graphs, advertisement, instruction, consumer information), drawing processes, occupational requirements, educational and vocational opportunities.
Woods	Industrial processes relating to producing products from wood or including wooden elements, building construction, cabinetry, furniture manufacture, lumber processing, occupational requirements, educational and vocational opportunity.
Graphic Communication	Industrial utilization of visual communication reproduction techniques, production processes related to image transfer, volume production, assembly procedures, occupational requirements, and educational and vocational opportunities.
Metals	Industrial utilization of metallic products and the processes employed to products made partially or totally from metal, types of metals, standard stock, forming–shaping–combining processes, occupational requirements, educational and vocational opportunities.
Electricity-Electronics	Focus on the industrial practices directed to producing, installing, and repairing electrical-electronic apparatus, devices and systems, occupational requirements, educational and vocational opportunities.
Power Mechanics	Directed to the study of industrial processes utilized to transform energy to power; motors, engines, electro-mechanical fluid control systems, design – operation – control – repair of power producing and utilizing devices or systems, occupational requirements, and educational and vocational opportunities.
Textiles	Industrial processes employed to produce textile fibers and textile products, process requirements for materials, equipment and manpower, occupational requirements, and educational and vocational opportunity related to the textile industry.

Plastics

Industrial utilization of processes to produce synthetic materials identified as plastic materials, and the processes used to make products from plastic stock, occupational requirements, and the educational and vocational opportunities associated with the plastic industry.

2.4 Special Programs

Industrial arts education programs may also be organized to meet specialized needs for adults, mentally retarded children, the physically handicapped, and the mentally gifted. Team teaching by the shop instructor with special education teachers is recommended for classes of mentally and physically handicapped students.

Adults

Adult classes can be geared to the study of technical subjects for the sake of creativity, craftsmanship, occupational exploration towards more specific vocational training, self-improvement, hobby development, and general maintenance and repair skills. Typical adult courses might include Fundamentals of Electricity, Fundamentals of Radio, Mechanical Drawing, Photography, Woodwork, Upholstering, Art Metal Work, Model-making, and Small Engine Maintenance and Repair. Adult courses should be highly individualized, varied in offerings and designed to meet community needs.

Gifted

Classes for gifted students may be accelerated and correlated with the mathematics or science departments. Students preparing for future careers in engineering or other technological professions might follow a curriculum including one semester each of drafting, electricity, power mechanics, metals and technical drawing.

Handicapped

Physically handicapped youngsters can reap many practical and therapeutic benefits from working with tools. Equipment, supplies, and subject must be adapted to the degree and nature of each child's disability, and precaution taken to plan a program which will avoid danger and fatigue to the children, challenge them to help themselves as much as possible, and assist them in developing occupational skills and worthwhile leisure activities.

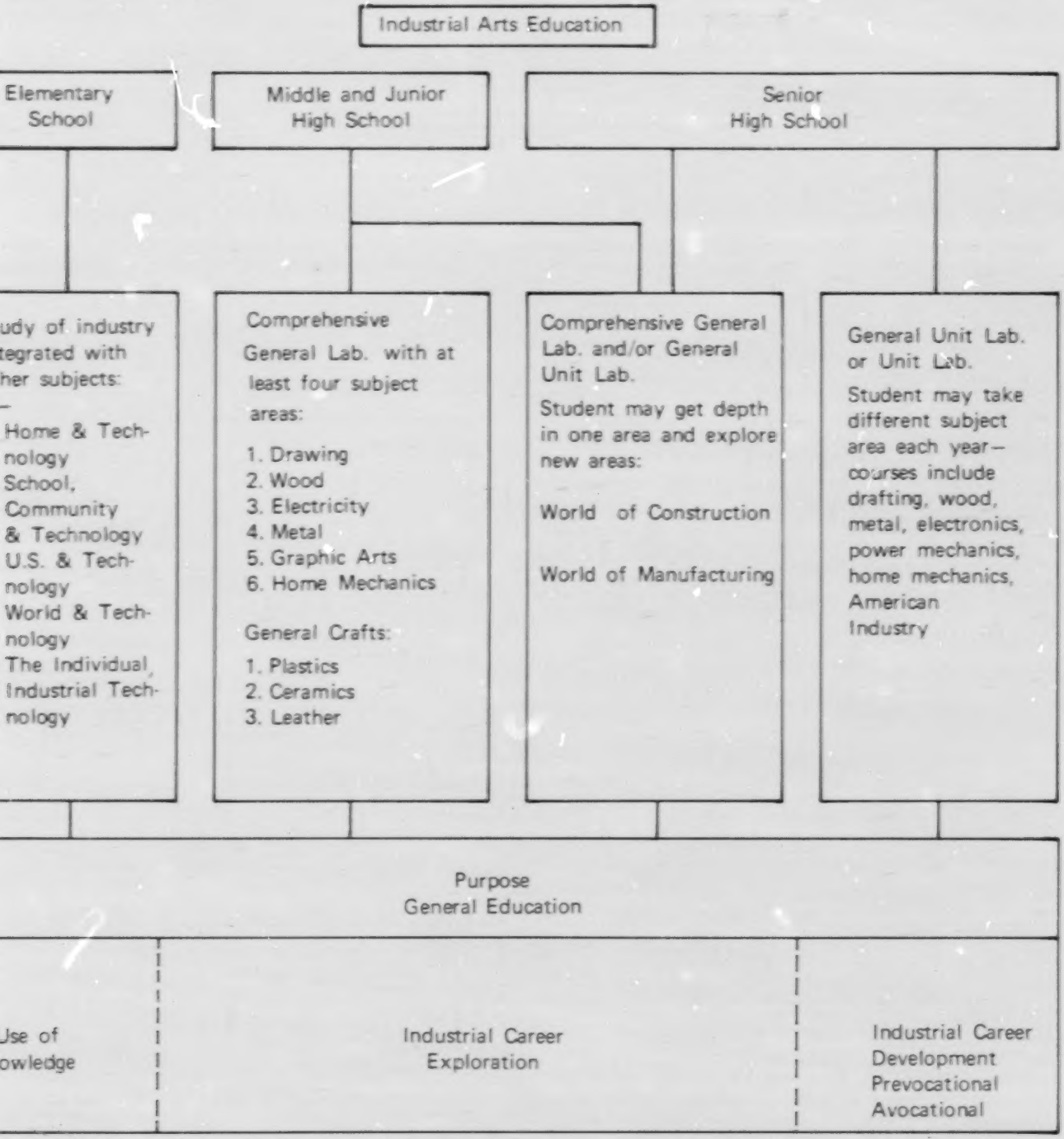
Retarded

Classes designed for the mentally retarded should be small with emphasis on therapeutic value, home maintenance use, safe work practices, and developing self-confidence of each individual.

The problem of program planning and evaluation of on-going programs is a difficult and complex task. While planning and evaluation instruments are available, singularly they cannot effectively measure the worthiness of the total industrial arts program. They must be supplemented by an awareness of area and local needs and problems. However, they provide general direction and avenues for improvement, and promote interaction so necessary for on-going program planning.

Improvement of the industrial arts instructional program will only result by means of continuous program planning and reexamination of existing course offerings. Industrial arts, just as that element of our society which it structures itself to teach, must keep abreast of present day industrial practices. Persons charged with the responsibility of industrial arts program planning must find the instructional content in today's industry, not historic industry.

2.5 RECOMMENDED ORGANIZATIONAL PLAN


Industrial Arts Education
Elementary School
Middle and Junior High School
Senior High School
udy of industry tegrated with her subjects: – Home & Technology School, Community & Technology U.S. & Technology World & Technology The Individual, Industrial Technology
Comprehensive General Lab. with at least four subject areas:
1. Drawing
2. Wood
3. Electricity
4. Metal
5. Graphic Arts
6. Home Mechanics
General Crafts:
1. Plastics
2. Ceramics
3. Leather
Comprehensive General Lab. and/or General Unit Lab.
Student may get depth in one area and explore new areas:
World of Construction
World of Manufacturing
General Unit Lab. or Unit Lab.
Student may take different subject area each year – courses include drafting, wood, metal, electronics, power mechanics, home mechanics, American Industry
Purpose
General Education
Use of owledge
Industrial Career Exploration
Industrial Career Development
Prevocational
Avocational

Structured programs such as World of Construction are recommended for grades which they were designed. World of Construction and World of Manufacturing (generally 7 and 8), American Industry (generally 9-12).

Laboratory Facilities

3.0 LABORATORY FACILITIES

3.1 Philosophic Statement

In planning the industrial arts education laboratory requirements for a particular school, many factors should be considered, such as the grade levels to be served, the scope of the curriculum, and both the potential school enrollment and the anticipated enrollment in the industrial arts education program. These factors determine the type and number of laboratories needed, as well as the size, types and quantity of equipment needed for each laboratory.

Planning pays dividends in constructing new facilities, remodeling existing facilities, or rearranging the layout in existing industrial arts education laboratories to facilitate a curriculum revision. Experience has shown that poor initial planning usually results in long-lasting ill effects to the program. Once a building is constructed, additional changes are slow in coming. It is recommended that experienced industrial arts education teachers or supervisors work closely with administrators and architects in planning industrial arts education laboratories.

3.2 General Planning

The following recommendations may be used in planning laboratories in most communities with necessary modifications to meet the needs of the students.

3.2.1 Size, Shape and Location

a. A laboratory area, square or of rectangular shape not exceeding a ratio of one to two, is best. Avoid recessed areas, "U," "L" and "T" shapes. All parts of the laboratory should be visible to the instructor.

b. A minimum of 100 square feet per pupil should be provided in laboratories and 50 square feet in drawing rooms. (General Metal Laboratory and Power Mechanics Laboratory require 100 to 150 square feet for each student.)

c. Minimum total floor area for laboratory, drawing room, planning room and storage room should be not less than 3000 square feet; of the total area not less than 1800 square feet should be provided as a basic teaching area.

d. Floor space of laboratory should be on one level, and should be located on the first floor.

e. Ceiling height should be at least 12 feet. Additional height for a hydraulic car lift or vertical storage of materials should be provided when necessary.

3.2.2 Walls, Floors and Ceilings

a. Ceiling should be acoustically treated.

b. Partition between laboratories should be non-loadbearing walls of ceiling height, and of semi-permanent construction to permit future alterations.

c. Concrete floors in drawing room, and planning room should be covered with floor tile.

d. Provide transparent panels or transparent panel door from wainscot height to six feet above the floor in partitions and doors between laboratory and auxiliary rooms.

e. Where concrete floors are used and color is desired, the color should be added at the time the floor is poured.

3.2.3 Windows and Doors

a. Windows should be designed with the least amount of conflict with machines and other equipment.

b. Provide only one entrance as the regular means of student use.

c. Provide an 8' x 10' overhead door with service ramp and paved drive.

d. Door locks in laboratories should be of a master key type.

3.2.4 Illumination and Electrical

a. A minimum of 100 foot candles at bench height should be provided in laboratories and drawing rooms. Special location lights may be provided where necessary. (See State Facility Guide for Public Schools.)

b. Safety switch control should be placed in all laboratories at predetermined location. With the safety switch, all machines must have magnetic motor controls.

c. Lighting circuits should be separate from circuits for machines and wall outlets. (Overhead buss bars might be considered for heavy machines and portable power tools.)

d. Overhead buss bars, floor and wall outlets containing 220 volts three phase, 220 volts single phase, and 110 volts should be provided to permit flexibility. (A minimum of 25% above present electrical requirements should be provided for future needs.)

e. At frequent intervals, locate convenience outlets in the walls of the laboratory at least 36 inches above the floor. (Special consideration must be given to high voltage outlets.)

f. Locate the office in a position where a full view of the laboratory is possible.

g. Provide a planning center with a display of library reference material.

h. Provide storage space for materials, supplies and projects.

3.2.5 Other Facilities

a. Equip finishing rooms with adequate exhaust, explosive proof electrical fixtures and storage for flammable materials.

b. A wash basin and a drinking fountain should be provided in each laboratory.

c. Unit type heaters mounted near the ceiling are acceptable.

d. Provide chalk board and bulletin board space.

3.2.6 Equipment and Arrangements

a. Provide dust collectors for machines and forced exhausts for fumes.

b. Machines that are used for roughing out stock should be placed near the storage areas.

c. Locate related instructional equipment together.

d. Provide aisles to commonly used areas. Provide ample space around equipment.

e. Provide open tool panels and/or mobile tool units.

3.3 Tools and Equipment

A list of up-to-date tools and equipment for each type of laboratory may be secured through the office of the state supervisor of industrial arts education.

Teacher Prepration

4.0 TEACHER PREPARATION, CERTIFICATION, AND IN-SERVICE EDUCATION

4.1 Preparation

The teacher must possess skills sufficient to demonstrate all of the tasks he expects his students to perform. He should be a graduate of an approved teacher preparation program in industrial education or industrial arts education. The prescribed teacher education curriculum should include courses in which the prospective teacher can gain proficiency in at least five industrial arts education subject areas. He must also develop competency in "how to teach".

The teacher preparation program leading to a Bachelor's Degree must include courses in three categories as follows: (1) General Education, (2) Professional Education, and (3) Industrial Arts Courses. The requirements for a professional certificate in industrial arts are presented below.

REQUIREMENTS

A. Bachelor's Degree

B. Composite National Teachers Examination score of 975 with a minimum of 450 on the Common Examinations and 450 on a teaching area examination.

C. General Education – 42-45 Semester Hours

	Semester Hours
English	12
Biological and Physical Sciences	12
Social Studies	12
Health	2-3
Art and Music	4-6

D. Professional Education – 18 Semester Hours

1. Adolescent Growth and Development
2. Principles and Philosophy of Education
3. Principles of Learning, Secondary School Materials and Methods

12

NOTE: 1, 2, and 3 must be represented.

4. Directed Teaching 6

F. Industrial Arts Courses – 24 Semester Hours

1. A minimum of three semester hours in each of four or more shop activities such as wood, metal, graphic arts, electricity, automotive, ceramics, plastics, textiles, trowel work, art crafts, etc. 12

2. A minimum of four semester hours in courses of related drawing and design, including at least two of the following: Mechanical drawing, sketching, drafting, mechanical equipment and design, graphic arts design. 4

3. Electives from any of the above listed courses. 8

4.2 Certification

The certification of teachers depends on the applicant's college education, his score on the National Teachers Examination, and the number of years of his teaching experience.

New teachers meeting the above educational requirements with no experience receive a probationary teacher's certificate which is valid for five years. (Information on group, class, types of certificates, renewals, etc., may be secured from the Office of Teacher Education and Certification, State Department of Education, Columbia, South Carolina 29201.)

4.3 Professional Growth

If industrial arts education programs in South Carolina's public schools are to keep abreast of the rapidly changing industrial society, teachers must make an effort toward self-improvement professionally, as well as technologically.

One of the best means by which one can improve himself is to attend summer courses which deal with the many aspects of industrial arts education. Summer programs presently being offered at Clemson University and South Carolina State College are designed to serve the teachers of industrial arts education. Until larger numbers of teachers participate in these programs, little can be accomplished. Before an adequate summer program can be offered by either of these institutions, there must be a demand for such programs.

Another way in which the teacher can keep abreast of the changing technology is through a planned program of cooperative work experience in industry during the summer weeks. Such a program would be initiated by the teacher himself.

It is suggested that all industrial arts education teachers develop a personal plan for self-improvement by participating in the following activities:

1. Attend summer school for six (6) credit hours of work at least once in three years.
2. Attend district workshops or conferences in industrial arts education.
3. Subscribe to, and read the professional journals and magazines in the field of industrial arts education.
4. Become an active and participating member of the state industrial arts teacher's organization.
5. Work with industry during the summer.

Management

5.0 MANAGEMENT

5.1 The State Supervisor

In the administration of industrial arts education, there must be communication between all areas of supervision and instruction; from the classroom teacher to the state supervisor. The state supervisor, upon request, is an available consultant to all having questions related to industrial arts education. It is the responsibility of the state supervisor to:

1. develop long-term programs of industrial arts education for the state.
2. serve as consultant to all other industrial arts personnel.
3. participate in county and district teacher meetings.
4. distribute information to teachers.
5. aid in the layout and design of facilities.
6. counsel with teachers concerning local programs, college courses, certification and standards.
7. coordinate work with state supervisor in other institutional areas.
8. acquaint school officials and the general public with philosophy, aims, objectives and status of industrial arts education in South Carolina.
   a. Make the State Guide for Industrial Arts available upon request.
   b. Keep teacher-education departments informed relative to the supply and demand for teachers.
9. serve as a liaison between state and local administrative levels of industrial arts and industries within the state.

5.2 The Local Supervisor

Depending on the size of the district or county, there should be one or more full-time or part-time supervisors of industrial arts education. The full-time or part-time local supervisor:

1. coordinates the efforts of the different programs under his supervision.
2. assists teachers in preparing instructional materials, including visual aids.
3. assists in planning, organizing and modernizing industrial arts laboratories.
4. assists in organizing machines, tools and supply list in local situation.
5. promotes safety practices in school laboratories.

6. visits the program regularly.

7. up-grades teacher qualifications.
   a. promotes professionalism.
   b. plans and executes in-service teacher education.

8. recommends qualified teachers for employment.

9. coordinates program with other instructional supervisors at the local level. Advises local officials as to the number of students depending upon the type of student and the course being conducted.

10. serves as a liaison between the the industrial arts program, community and industry.

5.3 The School Principal

The principal is responsible for the administration and day to day supervision of all instructional programs included in the curriculum of the school. He must be aware of and seek to satisfy his responsibilities to industrial arts if the programs are to accomplish their objectives. The responsibilities of the principal relative to industrial arts are to:

1. become familiar with the philosophy, aims and objectives of industrial arts education.

2. support and demand a comprehensive program.
   a. provide an adequate budget for a comprehensive program.
   b. provide the teacher with ample school time for on-going program development.
   c. schedule industrial arts students in the middle, junior and senior high schools on the same basis as other subjects (English, math, or science).

3. promote industrial arts both within school and community.

5.4 The Teacher

The teacher carries out the plans he and his supervisors formulate. The responsibilities of the industrial arts teacher are to:

1. plan, organize and evaluate his day to day instruction of industrial arts.
   a. become familiar with the industrial arts program objectives for his state, county or district and school.
   b. work with school administrators, local and state, and community leaders in planning for industrial arts.
   c. develop a course of study based on sound educational principles.

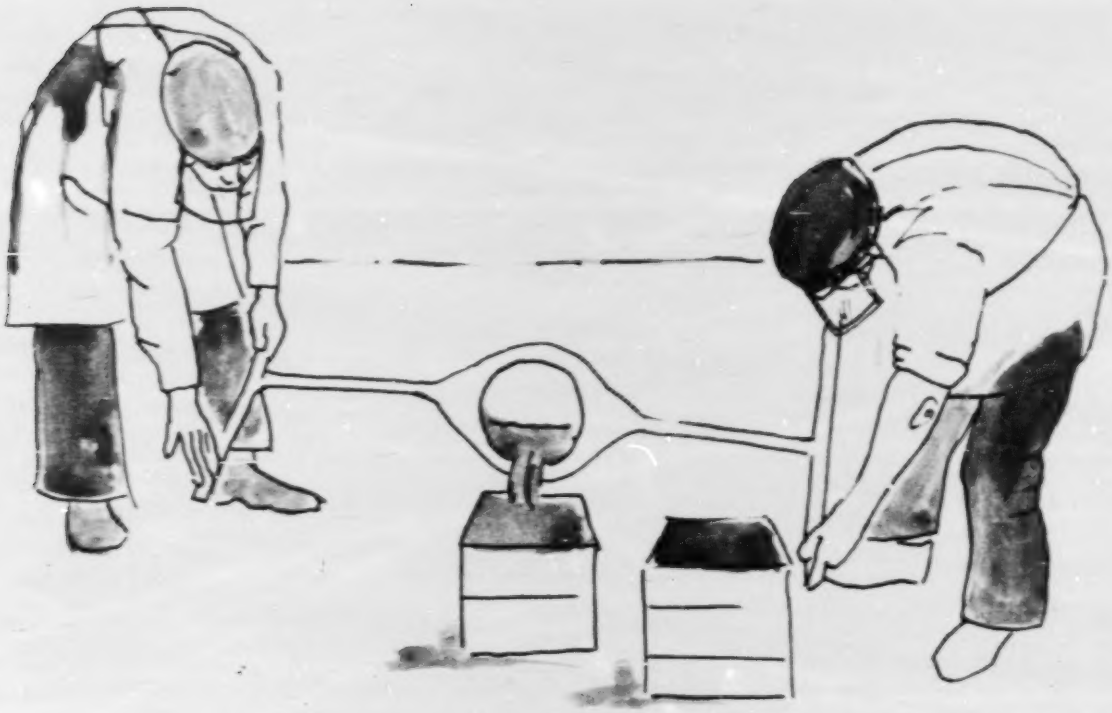
2. conduct himself and his classes in such a manner that the philosophy, aims and objectives of industrial arts prevail.

3. continually evaluate his program in terms of changing community and industrial needs.

4. keep the public informed as to the content of industrial arts.

5. establish and maintain a personal professional development plan.

Safety



6.0 SAFETY

6.1 Safety Guidelines

Safety in the industrial arts education program consists of providing conditions that will be favorable to the general health of the student and in offering instruction that will guide him in forming habits of procedure leading to the prevention of accidents. The following safe working conditions should be provided for the student.

6.1.1 The Work Area

The size and shape is determined by the type of equipment to be used, type of work to be done, proper storage of supplies and adequate space for project storage.

a. It should be properly heated, ventilated, painted, and lighted.
b. Safe and convenient power outlets should be provided.
c. Precaution against fire requires control equipment and unrestricted exits.

6.1.2 Layout of Area

a. Proper arrangement of hand tools and portable machines.
b. Proper arrangement of machines with protection from movable parts, and with a well-defined operation zone of sufficient size.
c. The floor must have no obstruction and be treated against slippage.
d. Adequate space for general assembly areas and for individual work stations.
e. Proper arrangement for storage of supplies and projects.

6.1.3 Record Keeping

In addition to treatment, each accident should be reported and a record kept so that accurate information will be available if it is needed for additional treatment or for filing an insurance claim.

Safety practices are of such importance that they must be observed by the instructor and every member of the group. Any unsafe procedure should be reported immediately by the student designated as safety foreman, or by any other member of the group.

The safety program should be outlined and put into action on the first day of school. Information must be given by the instructor, but the program is best conducted by the safety foreman of the student personnel organization.

A checklist of hazardous items enables the safety forman to mark daily any situation that needs attention. The list fastened to a clipboard gives the safety foreman a mark of authority as he performs his duties.

Of equal value with the provision of a well planned and equipped laboratory is its safe use. This phase is accomplished by giving information and instruction with insistence that safe

practices be observed. For additional help, The Safety Handbook – A Guide for Industrial Arts Programs published by the State Department of Education should be used to supplement this chapter.

6.2 Legal

6.2.1 State Law

The state safety law concerning eye protection is stated below:

ARTICLE 8
Provisions Affecting Schools and Teachers

32-697. Pupils and teachers in certain courses to wear protective eye devices; purchase of such devices; protective-corrective devices. Every pupil and teacher in any public school participating in any of the following courses:

a. Vocational or industrial art shops or laboratories involving use of or exposed to:
   (1) Hot molten metals;
   (2) Milling, sawing, turning, shaping, cutting or stamping of any solid materials;
   (3) Heat treatment, tempering of kiln firing of any metal or other materials;
   (4) Gas or electric arc welding;
   (5) Repair or servicing of any vehicle;
   (6) Caustic or explosive materials.

b. Chemical or combined chemical-physical laboratories involving caustic or explosive chemical or hot liquids or solids is required to wear industrial quality eye protective devices at all times while participating in such courses or laboratories. The trustees of each school district shall purchase and cause such plano protective eye devices to be placed in such public schools for the eye protection of pupils, teachers and visitors to such classrooms or laboratories.

c. Any person desiring protective-corrective lenses instead of plano protective devices supplied by the school trustees shall at his own expense procure and equip himself with industrial quality eye protective devices secured from legally authorized dispensers.

The phrase "industrial quality eye protective devices," as used in this section, means devices meeting the standards of the American Standard Safety Code for Head, Eye and Respiratory Protection, Z2.1-1959, promulgated by the American Standard Association, Incorporated. (1965 (54) 679).

Minor accidents, if they occur, may be cared for by providing and using a properly stocked first aid kit. If there is doubt as to the effectiveness of the treatment, a parent should be notified. In the event of an emergency, professional aid must be obtained at once.

6.2.2 Teacher Liability

The following excerpt was taken from Agriculture Shop Safety, Teacher's Guide, page 3, published by South Carolina State Department of Education in cooperation with the Vocational Education Media Center, Clemson University, 1969.

While the school district and the school board are immune to suit for damages, the teacher is not. In the case of an accident resulting from negligence, the individual directly responsible (perhaps the teacher) may be held personally liable. The fact that the teacher is employed by a governmental (state) agency does not provide him immunity. In an effort to clarify this point, the office of the Attorney General for South Carolina was contacted. The answer received can best be summed up in this paragraph quoted from the letter received from the Attorney General's office:

"There being no South Carolina Law on the subject, the only advise that can be given is that the teachers try to be as free from negligent conduct as possible. If there is no negligence on the teacher's part, there can be no liability, but if the teacher is negligent, there may be liability. What may constitute negligent conduct of teachers is again unanswerable as we have no cases."

The teacher's actions are governed by the common-law principle that charges every individual to act or use those things under his control to prevent injury to anyone else. A teacher is expected to practice the same degree of care and prudence that any other reasonable person would have practiced in the same or similar situation.

Legally, the teacher's relationship with his students is described by the Latin phrase, "in loco parentis" (in place of the parents). In situations related to the education of his students, society expects the teacher to exercise some of the rights and duties of the parents. The teacher is expected to use reasonable care in the performance of these duties, since students have been entrusted to him.

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